

REMARKS:

In view of the foregoing remarks and the foregoing amendments, reconsideration and allowance are respectfully requested.

We have amended independent claims 1, 12, and 13. In particular, we have amended independent claims 1 and 13 to include the limitation recited in dependent claims 11 and 24 (now canceled) and have rewritten dependent claim 12 to be in independent form. We have also canceled claims 10, 25, and 30-35.

Rejections under 35 U.S.C. §102(b)

Independent Claim 1

The Examiner rejected independent claim 1 and dependent claim 11 (now canceled and included in amended claim 1) under 35 U.S.C. 102(b) as anticipated by Fujii. Applicants respectfully traverse. We submit that Fujii does not describe an “[a]pparatus comprising a plurality of droplet ejection devices...a first switch that has a first input connected to an electric source terminal, a first output connected to said piezoelectric actuator...wherein an applied electric source distributes an electrical signal to said first inputs....wherein said electrical signal is a controlled current signal,” as recited in amended independent claim 1. (emphasis added) Rather, Fujii describes a voltage source that may fluctuate due to a variety of causes. (col. 18, lines 8-13) To overcome these fluctuations, Fujii discloses a controlled voltage source to regulate the voltage, which can include varying the current.

Applicants recite a controlled current signal, which has many benefits, particular when used in conjunction with a constant capacitance on a piezoelectric actuator. Fujii is not concerned with controlled current or the benefits of using an actuator with constant capacitance. To the contrary, Fujii is concerned with maintaining a constant voltage and the capacitance 110 of Fujii's electrostatic actuator is variable as seen in Fig. 7.

Accordingly, applicants submit that claim 1 is not anticipated and respectfully request that the rejection under 35 U.S.C. 102(b) be withdrawn. Furthermore, because claims 2-6, 8-10,

12, 20, 21, and 27 depend from claim 1, these dependent claims are not anticipated for at least the same reason that independent claim 1 is not anticipated.

Independent Claim 13

The Examiner has rejected independent claim 13 under 35 U.S.C. §102(b) as anticipated by Fujii and dependent claim 24 (now canceled and included in amended claim 13) under 35 U.S.C. §103(a) as being unpatentable over Fujii in view of Murakami (U.S. 4,563,689). The Examiner acknowledged that Fujii failed to disclose an apparatus "wherein said first control signals are controlled to inject noise into images being printed so as to break up possible print patterns and banding" as recited in amended claim 13. The Examiner cited the ejection of satellite droplets in Murakami as disclosing this feature. (col. 2, lines 37-40) Applicants, however, submit that neither Fujii nor Murakami disclose or suggest this feature.

Murakami discloses ejecting a main ink droplet in which smaller satellite droplets are formed secondarily behind the main droplet. To achieve grayscale, Murakami describes charging the main droplet and deflecting it, such that only the small satellites land on the paper. (Col. 2, lines 37-55) Murakami does not describe "wherein said first control signals are controlled to inject noise...." Control signals are not used to eject the satellite droplets, rather the satellite droplets are mere artifacts of ejecting a main droplet. Murakami admits that these satellite droplets can not be controlled. "Since the satellite droplets are ones secondarily produced when the main droplets are ejected from the nozzle, the size thereof cannot be freely controlled." (Murakami, col. 2, lines 55-58) Thus, Murakami does not disclose the feature lacking in Fujii. Moreover, no proper combination of Fujii and Murakami provides any suggestion or teaching of the invention recited in amended claim 13.

Accordingly, applicants submit that claim 13 is not anticipated and respectfully request that the rejection under 35 U.S.C. 102(b) be withdrawn. Furthermore, because claims 14, 15, 20, 21, and 27 depend from claim 13, these dependent claims are not anticipated for at least the same reason that independent claim 13 is not anticipated.

Dependent claim 7

The Examiner rejected claim 7 under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of Murakami. The Examiner acknowledges that Fujii fails to disclose that a single resistance is used to charge and discharge a respective capacitance, and cites Murakami as disclosing this feature. However, Applicants submit that Murakami does not disclose the feature lacking in Fujii, "wherein said electrical signal is a controlled current signal" as recited in amended claim 1. Thus, any proper combination of Fujii and Murakami would not arrive at the claimed invention.

Accordingly, applicants submit that claim 7 is not obvious and request that the rejection under 35 U.S.C. 103 be withdrawn.

Dependent claims 17-19, 22, 23, 26, and 29

The Examiner rejected claims 7, 17-19, 22, 23, 26, and 29 under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of Murakami (US 4,563,689). The Examiner acknowledges that Fujii fails to disclose said first control signals are controlled to provide uniform droplet volumes or velocities from said plurality of droplet ejection devices or to provide predetermined different drop volumes or velocities from different droplet ejection devices so as to provide gray scale control. Fujii also does not disclose wherein said first and second control signals are controlled to provide predetermined different drop volumes or velocities from different droplet ejection devices so as to provide gray scale control.

The Examiner also recognizes that Fujii does not describe wherein said first control signals are controlled to provide a voltage that is insufficient to eject a droplet, but is sufficient to move a meniscus of a liquid at an ejection nozzle of said droplet ejection device; wherein said first and second control signals are controlled to provide a voltage that is insufficient to eject a droplet, but is sufficient to move a meniscus of a liquid at an ejection nozzle of said droplet ejection device; wherein said first and second control signals are controlled to vary the amplitude of charge as well as the length of time of charge on said piezoelectric actuator for the first droplet out of a droplet ejection device so as to match subsequent droplets; and wherein said controller controls said first switch as a function of the frequency of droplet ejection to reduce variation in

drop volume as a function of frequency. The Examiner cites Murakami as disclosing all of these features.

However, Applicants submit that Murakami does not disclose the features lacking in Fujii. In particular, Murakami does not disclose “wherein said electrical signal is a controlled current signal” as recited in amended claim 1, and “wherein said first control signals are controlled to inject noise into images being printed so as to break up possible print patterns and banding” as recited in amended claim 13. There is no proper combination of Fujii and Murakami that would arrive at the claimed invention.

Accordingly, applicants submit that claims 17-19, 22, 23, 26, and 29 are not obvious and request that the rejection under 35 U.S.C. 103 be withdrawn.

Dependent claim 28

The Examiner also rejected dependent claim 28 under 35 U.S.C. 103(a) as allegedly being unpatentable over Fujii in view of Murakami, as applied to claims 1 and 13, and further in view of Imanaka et al. (US 6,467,863) and Butterfield et al. (US 6,685,297). The Examiner acknowledges that both Fujii and Murakami fail to disclose “wherein said controller includes a field programmable gate array on a circuit board mounted to a monolithic body in which said fluid chambers are formed,” but cites Imanaka and Butterfield as disclosing these feature. Applicants submit that Murakami, Imanaka, and Butterfield fail to describe the features found to be lacking in Fujii. In particular, Murakami, Imanaka, and Butterfield fail to describe “wherein said electrical signal is a controlled current signal” or “wherein said first control signals are controlled to inject noise into images being printed so as to break up possible print patterns and banding” as recited in amended claims 1 and 13.

Accordingly, applicants submit that claim 28 is not obvious and request that the rejection under 35 U.S.C. 103 be withdrawn.

Conclusion

In view of the amendments and remarks herein, the Applicants believe that claims 1-9, 12-15, 17-23, and 26-29 are in condition for allowance and ask that these pending claims be allowed. The foregoing comments made with respect to the positions taken by the Examiner are


not to be construed as acquiescence with other positions of the Examiner that have not been explicitly contested.

Accordingly, the arguments for patentability of a claim should not be construed as implying that there are not other valid reasons for patentability of that claim or other claims.

A one-month extension of time fee for \$120 is included. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: October 31, 2006



Frank R. Occhiuti
Reg. No. 35,306

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110-2804
Telephone: (617) 524-5070
Facsimile: (617) 542-8906